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METHOD FOR TESTING SURFACE pH OF INORGANIC ZINC COATED STEEL

CAUTION: Prior to handling test materials, performing equipment setups, and/or conducting this method, testers are required to read "**SAFETY AND HEALTH**" in Section F of this method. It is the responsibility of the user of this method to consult and use departmental safety and health practices and determine the applicability of regulatory limitations before any testing is performed.

A. SCOPE

This test method is for the determination of the surface pH of inorganic zinc coated steel. This test method can be used under field or laboratory conditions. If the residual alkali present in the waterborne inorganic zinc coating has been sufficiently neutralized to a pH of 7 or less, the coating can be classified as cured.

The measure of the hydrogen ion concentration of a solution may be expressed in terms of the logarithmic pH scale (0-14). A pH of zero is considered the most acidic, a pH of 7 is neutral, and a pH of 14 is highly basic. Although waterborne inorganic zinc primer, when properly applied and allowed to dry, exhibits initial water insolubility and appears cured, it is not. Small amounts of water in contact with the surface for extended periods of time can extract residual hydroxide ions from the coating, raising the pH of the water sufficiently to resolubilize the coating. The inorganic zinc coating cures over a period of weeks to months by reacting with carbonic acid, which is formed by carbon dioxide and moisture from the air, rain, or dew, to complete the formation of a pH neutral zinc silicate matrix.

B. APPARATUS

1. Universal indicator pH paper with a range of (0-14) and a capability of measuring in increments of 0.5 pH units.
2. De-ionized water.
3. 4-inch diameter watch glass.
4. Adhesive tape.

C. PREPARATION OF SAMPLE

The surface of the sample being tested or the area being tested should be dry and free of dirt, debris, oil, and grease.

D. TEST PROCEDURE

1. Pour enough de-ionized water onto the surface of the inorganic zinc until a puddle 25 to 50 mm in diameter forms.
2. Tape a watch glass over the test area, if needed, to help prevent evaporation.
3 Allow the water to sit undisturbed for 15 minutes.
4. Place pH paper into the puddle so as to thoroughly wet its entire surface.
5. Quickly remove the pH paper and record the indicated pH value.

F. SAFETY AND HEALTH

Users of this method should be familiar with basic laboratory safety procedures as

specified in the Caltrans Laboratory Safety Manual.

Small amounts of water in contact with inorganic zinc painted surfaces can become highly alkaline and potentially harmful to the eyes or skin. Safety glasses and gloves should be worn when using this test method. Users of this method do so at their own risk.

REFERENCES:

ASTM Designation D 4262, and Corrosion Protection by Protective Coatings, 1997, Charles G. Munger

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(California Test 439 contains 2 pages)